METHOD AND SYSTEM FOR AUTOMATED HANDLING OF SERVICE PROBLEMS IDENTIFIED BY A WIRELESS DEVICE CUSTOMER

BACKGROUND OF THE INVENTION

Field Of The Invention

[01] The present invention relates to the field of telecommunications, and, more particularly, relates to a method and system for automated handling of service problems identified by a wireless device customer, such as an individual with a mobile telephone, a pager, or a personal data assistant with wireless connectivity.

Description of Related Art

[02] Presently, when a wireless device customer experiences problems with service, the customer contacts a customer service representative ("CSR") via telephone, email, or in-person at a retail store. The CSR is trained to ask certain questions and follow a specific decision-tree logic to gather information and data in order to assess and address the problem. However, although the CSR may be able to identify the problem, a CSR typically does not have the training or ability to actually resolve the problem. Instead, once the problem has been identified, technical support personnel must be contacted to make necessary adjustments to network components. This is often a time-consuming process, as a CSR may have to make multiple calls to locate the appropriate technical support person to assist with the problem. Even then, there may be an additional delay as the technical support person may not be able to address the problem immediately. Unfortunately, such delays inconvenience and frustrate the customer.

[03] Thus, there is a need for a method and system for automated handling of service problems identified by a wireless device customer, a method and system that would eliminate

the need for human intervention and facilitate rapid network adjustments to remedy service problems.

SUMMARY OF THE INVENTION

[04] The present invention is a method and system for automated handling of service problems identified by a wireless device customer, such as an individual with a mobile telephone, a pager, or a personal data assistant with wireless connectivity.

[05] Specifically, the present invention uses a diagnostic analysis to identify the specific nature of the service problem, and then initiates automated resolution of that problem by accessing and making adjustments to one or more network components.

[06] In one preferred embodiment for carrying out the method of the present invention, the first step involves the communication of certain information from a wireless device customer to a computer server through some sort of user interface device, the information including, for example, a telephone or pager number, user name, and/or similar identification information. The wireless device customer is then prompted to enter information about the system conditions, i.e., the conditions related to the service problem. As part of this inputting process, based on the information entered, additional information or data may be solicited from the user based on a decision-tree logic. Once the necessary information has been input, a comparison of that information is made to a database of known problems in order to identify the specific nature of the service problem.

[07] In another preferred embodiment for carrying out the method of the present invention, the communication of the necessary identification information and the information about the system conditions is communicated to the computer server through an agent or customer service representative who the wireless device customer has contacted to assist with a service problem

[08] In any event, once the specific nature of the service problem has been identified, an appropriate corrective action is automatically initiated by the server. One corrective action involves the adjustment of switch settings. To make necessary adjustments to the switch settings, it is preferred that a telnet client session be automatically initiated by the server to connect to a switch. Through such a connection, the settings associated with the particular mobile station in issue can be checked and adjusted as necessary. This is preferably accomplished, without the intervention of a technician, through execution of a set of computer instructions (e.g., a UNIX script) communicated to the switch through the telnet client session or

similar communication medium. In other words, the necessary sets of computer instructions can be characterized as preprogrammed fixes that are stored in a database and responsive to specific identified service problems.

[09] Finally, it is also contemplated that corrective actions could be initiated to make adjustments to or otherwise resolve issues associated with network components other than switches without the intervention of a technician, but within the spirit and scope of the present invention. For example, such corrective actions may also include downloading of certain settings, software updates, or maintenance programs to the wireless device using an Over-the-Air (OTA) server; or the modification of certain customer-related information on Internet access servers.

BRIEF DESCRIPTION OF THE DRAWINGS

[10] Preferred and alternative embodiments are described with reference to the attached figures wherein like reference numerals indicate similar or identical features or functions, and wherein:

[11] Figure 1a is a schematic diagram illustrating how a wireless device customer may initiate communication with the computer server in accordance with the method and system of the present invention;

[12] Figure 1b a schematic diagram illustrating how communication with the computer server may be facilitated through an agent or customer service representative in accordance with the method and system of the present invention; and

[13] Figure 2 is a flow chart illustrating the method steps involved in an exemplary implementation of the method and system of the present invention.

DETAILED DESCRIPTION OF THE INVENTION

[14] The present invention is a method and system for automated handling of service problems identified by a wireless device customer, thus allowing service problems to be rapidly addressed. Specifically, the present invention uses a diagnostic analysis to identify the specific nature of the service problem, and then initiates automated resolution of that problem by accessing and making adjustments to one or more network components.

[15] As will become clearer in the description that follows, the various logical and operational steps of the method and system of the present invention are achieved through the

use of a digital computer program. With benefit of the foregoing description, appropriate software coding is readily accomplished by one of ordinary skill in the art.

[16] Referring first to the flow chart of Figure 2, in this exemplary implementation of the method of the present invention, the first step involves the communication of certain information from a user, as indicated at blocks 20 and 22 of Figure 2. For purposes of this description, the user may be the wireless device customer, or perhaps an agent or customer service representative who the wireless device customer has contacted to assist with a service problem. In any event, it is contemplated that the user first initiate communication with a computer server 10 through some sort of user interface device. In this regard, the server 10 hosts the digital computer program that carries out the necessary logical and operational steps. As for the user interface device, it can be any device that allows for the exchange of information between the user and the server 10.

[17] As illustrated in Figure 1a, when the "user" is the wireless device customer, some examples of an appropriate interface device include: a personal computer 12 operably connected to the server 10 through the Internet or similar computer network; a personal digital assistant 14 again operably connected to the server 10 through the Internet; and/or a telephone 16 for communicating with the server 10 through touchtone or voice recognition techniques. Indeed, it is contemplated that a wide variety of telecommunication technologies could be used without departing from the spirit and scope of the present invention, including: cellular communications; wireless Short Message Service (SMS); Wireless Fidelity (WiFi), wireless local area networks operating under the 802.1x IEEE standards; and/or Mobitex, a packetized narrow-band data service.

[18] As illustrated in Figure 1b, when the "user" is an agent or customer service representative who the wireless device customer has contacted serve as an intermediary and to assist with a service problem, a common interface device would be again be a personal computer 12b operably connected to the server 10 through the Internet or similar computer network. Of course, any of the technologies described above with reference to the customer could also be utilized by the agent or customer service representative to initiate communication with the server 10 without departing from the spirit and scope of the present invention.

[19] Regardless of the specific interface device utilized, once communication has been established between the server 10 and the user, certain identification information is communicated to and received by the server, as indicated at block 20 of the flow chart of Figure 2. This information may be automatically communicated to the server, for example, through called ID or similar technologies that allow for identification of a device or individual.

Alternatively, the user may be prompted to input the telephone or pager number, user name, and/or similar identification information. Although not illustrated in Figure 2, such identification information can be further used to query customer databases and accumulate additional information and data about the customer for subsequent analysis.

[20] After the identification information is received and stored, the user is prompted to enter information about the system conditions, i.e., the conditions related to the service problem, as indicated at block 22. As part of this inputting process, based on the information entered, additional information or data may be solicited from the user based on a decision-tree logic. For example, if the user reports that mobile telephone calls are not being received, a second set of questions might be presented in order to narrow down and identify what specifically is causing calls not to be received. In any event, once the necessary information has been input, a comparison of that information is made to a database 25 of known problems in order to identify the specific nature of the service problem, as indicated at block 24. In other words, the server 10 employs a diagnostic logic to identify the specific nature of the service problem.

[21] In the method and system of the present invention, once the specific nature of the service problem has been identified, an appropriate corrective action is automatically initiated, as indicated at block 26. In this regard, it should be recognized that the term "corrective action" should be broadly interpreted to not only include actions in response to "errors," but also includes routine maintenance items, as is further described below.

[22] One corrective action involves the adjustment of switch settings. In this regard, it is important to recognize that each wireless device in a network is commonly referred to a mobile station. With respect to the use of a mobile telephone, when a call is initiated, an initiation request is transmitted from the mobile station to the nearest base station. The base station then communicates the request to a mobile switching center. The mobile switching center is the nucleus of the network, connecting to the land-based, public switched telephone network. As such, the mobile switching station is responsible for validating and authenticating calls initiated from each mobile station, and then setting up and maintaining those calls. Such a network architecture is well known to one of ordinary skill in the art. Since the mobile switching center is so critical to operation of the telecommunications network, whether for a mobile telephone, a pager, or a personal data assistant with wireless connectivity, switch settings are often to blame for customer service problems.

[23] Referring again to Figure 2, once the specific nature of the service problem has been identified, one corrective action is adjustment of the switch settings, as indicated at block 30. Preferably, a telnet client session is automatically initiated by the server 10 to connect to

the switch 32, which could be either the customer's home switch or a serving switch. Through such a connection, the settings associated with the particular mobile station in issue can be checked and adjusted as necessary. For example, if the customer has failed to pay a bill, the settings may indicate that the mobile station has been intentionally disabled and that information can be communicated back to the user. However, in many cases, minor adjustments to the switch settings may resolve the customer complaint.

[24] With respect to the use of a telnet client session, it should be recognized that such a communication technique is commonly used by network engineers and is well-recognized by those of ordinary skill in the art. Nevertheless, instructions could also be communicated to the switch through other known technologies without departing from the spirit and scope of the present invention, including, but not limited to, File Transfer Protocol (FTP), Secure FTP, HyperText Transfer Protocol (HTTP), HyperText Transfer Protocol Secure (HTTPS), Simple Object Access Protocol (SOAP), and Java Messaging Services (JMS).

[25] For example, if a user reports (through the input routine described above) that a particular mobile telephone rings once and then goes straight into voicemail, adjustments can be made at the switch 32 to increase the setting that governs the ring time before routing a call into voicemail. This is preferably accomplished, without the intervention of a technician, through execution of a set of computer instructions (e.g., a UNIX script) communicated to the switch 32 through the telnet client session or similar communication medium. Thus, the necessary sets of computer instructions are essentially preprogrammed fixes that are stored in a database 31 and responsive to specific identified service problems.

[26] For another example, if a user reports that a particular mobile telephone does not ring when someone calls the mobile number, an adjustment can be made at the switch 32 to increase the setting that governs the number of pages. Again, this is preferably accomplished, without the intervention of a technician, through execution of a set of computer instructions stored in database 31 and communicated to the switch 32.

[27] For yet another example, if a user reports that there is a busy recording on outbound calls from a mobile telephone, the electronic serial number can be verified and appropriate adjustment made if there is a mismatch at the switch 32.

[28] For yet another example, and returning to the circumstances in which the customer has failed to pay a bill, the server 10 may be operably connected to the billing system (not shown) such that, upon notification to the user that the mobile station has been intentionally disabled, the user may have the option of paying the bill by credit card or similar means. Upon

confirmation of payment, the server 10 would effectuate the appropriate adjustments at the switch 32 to re-activate service.

[29] Of course, the above are only examples of the types of switch setting adjustments that could be carried out in accordance with the teachings of the present invention.

[30] Referring still to Figure 2, another corrective action might involve the downloading of certain settings, software updates, or maintenance programs to the wireless device using an Over-the-Air (OTA) server. With reference to Figure 2, once the specific nature of the service problem has been identified and related to certain setting or software on wireless device, the server 10 communicates appropriate instructions to the OTA server 35, as indicated at block 34, resulting in the downloading of the appropriate settings, software updates, or maintenance programs to the wireless device.

[31] For example, if a user wanted to switch from a pre-pay option to a monthly billing option for his wireless device, certain software downloads would be required to effectuate the billing change. Using the OTA server, such downloads could be effectuated without the assistance of technical personnel.

[32] For another example, it may be necessary for a user to update the Intelligent Roaming Database (IRDB), the list of acceptable networks in which a wireless device can roam and operate, which is stored in the memory of the wireless device. Again, using the OTA server, such an update could be effectuated without the assistance of technical personnel. Such an update might be especially important for a customer transferring to a new carrier pursuant to governmental Wireless Local Number Portability (WLNP) regulations.

[33] Referring still to Figure 2, yet another corrective action resolution might involve the modification of certain customer-related information on Internet access servers. Specifically, such Internet access servers handle tasks such as authenticating Internet connections and controlling and monitoring user connection to the Internet. Therefore, once the specific nature of the service problem has been identified as relating to the Internet access servers, the server 10 can communicate appropriate instructions to the Internet access server 37, as indicated at block 36, to modify the pertinent settings.

[34] Again, the above are only examples of the types of corrective actions, including routine maintenance functions, that could be carried out in accordance with the teachings of the present invention. It is contemplated that corrective actions could also be initiated to make adjustments to or otherwise resolve issues associated with various other network components without the intervention of a technician without departing from the spirit and scope of the present invention.

[35] Finally, it is recognized that in some circumstances, if no appropriate corrective action can be identified based on the inputted system conditions, it may be necessary to transmit a message to appropriate technical personnel for resolution, as indicated at block 40 of Figure 2. It is contemplated that such a message would contain a detailed description of the service problem, including all solicited customer data and information used to assess the service problem. Similarly, if there was a failure in the adjustment of the switch settings (at block 20); failure in the downloading of appropriate settings, software updates, or maintenance programs to the wireless device (at block 34); or failure in the modification of Internet access server settings (at block 36), a message could also be transmitted to the appropriate technical personnel for resolution, as indicated at block 40 of Figure 2.

[36] Although not illustrated in the flow chart of Figure 2, as service problems are addressed and identified in accordance with the method and system of the present invention, it is contemplated that service problems could be stored for trend analysis and/or to identify network equipment problems.

[37] Again, it is important to recognize that the various logical and operational steps of the method and system of the present invention are achieved through the use of a digital computer program. Such a computer program (or similar computer-readable instructions) is preferably installed and stored on the server 10. With benefit of the foregoing description, appropriate software coding is readily accomplished by one of ordinary skill in the art.

[38] Thus, the method and system of the present invention provides for automated handling of service problems identified by a wireless device customer such that service problems can be rapidly addressed.

[39] It will be obvious to those skilled in the art that further modifications may be made to the embodiments described herein without departing from the spirit and scope of the present invention.